R E P O R T R E S U M E S

ED 017 738 VT 005 134

AN EDUCATION SYSTEM FOR THE 70'S.

BY- BUSHNELL, DAVID S.

PUB DATE 67

EDRS PRICE MF-$0.25 HC-$0.96 22P.

DESCRIPTORS- *HIGH SCHOOL CURRICULUM, *CURRICULUM DEVELOPMENT, CURRICULUM PLANNING, *SYSTEMS DEVELOPMENT, *EDUCATIONAL OBJECTIVES, INDIVIDUAL NEEDS, BEHAVIORAL OBJECTIVES, *INTEGRATED CURRICULUM, ORGANIC CURRICULUM,

ALTHOUGH THE UNITED STATES' EDUCATIONAL SYSTEM HAS MANY ACHIEVEMENTS, IT HAS MANY INADEQUACIES. THERE IS A NEED FOR A CLEARER DEFINITION OF GOALS AND AN OVERHAUL OF THE EDUCATIONAL PROCESS. ALTHOUGH A LACK OF WELL-DEFINED OBJECTIVES AND INADEQUATE MEASURING PROCEDURES HAVE PREVENTED ITS EFFECTIVE USE, THE SYSTEMS ANALYSIS METHODOLOGY USED BY BUSINESS CAN BE APPLIED TO THE PROBLEMS OF EDUCATION. A PROPOSED SYSTEM, THE "ORGANIC CURRICULUM," WILL MAKE POSSIBLE THE ACHIEVEMENT OF THE OBJECTIVES OF PREPARING STUDENTS WITH ENTRY-LEVEL JOB SKILLS, BASIC LEARNING SKILLS, CROSS-TRAINING IN A CLUSTER OF OCCUPATIONS, TRAINING FOR THE ROLES OF CITIZENS AND ADULTS, AND PERSONAL DEVELOPMENT SKILLS SUCH AS COMMUNICATION, INQUIRY, AND PROBLEM SOLVING. A STUDENT WHO GRADUATES FROM HIGH SCHOOL SHOULD HAVE THE NECESSARY QUALIFICATIONS FOR MAXIMUM FLEXIBILITY IN POST-HIGH SCHOOL OPTIONS. THE INTEGRATION AND INTERACTION OF VITAL COMPONENTS WHICH WILL RESULT FROM A SYSTEMS DESIGN WILL INSURE THE MOST EFFICIENT AND EFFECTIVE LEARNING FOR THE INDIVIDUAL STUDENT THROUGH INDIVIDUALLY PRESCRIBED PROGRAMS LEADING LOGICALLY TO ACHIEVEMENT OF ADULT BEHAVIORAL GOALS. STEPS FOR IMPLEMENTING THE SYSTEMATIC APPROACH INCLUDE STATING THE PROGRAM OUTPUT SPECIFICATIONS IN TERMS OF BEHAVIORAL OBJECTIVES, SYNTHESIZING THE OBJECTIVES AMONG THE VARIOUS DISCIPLINES, DEVELOPING APPROPRIATE MATERIALS AND MEASUREMENT INSTRUMENTS, AND SELECTING MEDIA. SEVENTEEN SCHOOL DISTRICTS HAVE BEEN SELECTED TO PREPARE FOR THE NEW "ORGANIC CURRICULUM" WHILE THE BEHAVIORAL OBJECTIVES ARE BEING DEVELOPED. THE PLAN CALLS FOR AN INVESTMENT OF $30,000,000 OVER THE NEXT 5 YEARS. IN SUMMARY, THIS EDUCATIONAL PROGRAM INCORPORATES THE IDEA OF A CONTINUOUS PROGRAM CURRICULUM WITH INSTRUCTIONAL TECHNIQUES THAT EMPHASIZE ACTIVE DEVELOPMENT, POSITIVE ACHIEVEMENT, AND SELF-DIRECTION OF STUDENTS. THIS SPEECH WAS DELIVERED AT THE AEROSPACE EDUCATION FOUNDATION CONFERENCE (WASHINGTON, D.C., SEPTEMBER 12, 1967). (MM)

DOCUMENT FILMED FROM BEST AVAILABLE COPY

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

ED017738

AN EDUCATION SYSTEM FOR THE 70's

presented at

AEROSPACE EDUCATION FOUNDATION CONFERENCE

SHERATON-PARK HOTEL, WASHINGTON, D. C.

SEPTEMBER 12, 1967.

BY

DAVID S. BUSHNELL, DIRECTOR

DIVISION OF COMPREHENSIVE AND VOCATIONAL EDUCATION RESEARCH

U. S. OFFICE OF EDUCATION

VT005134

AN EDUCATION SYSTEM FOR THE 70's

For years this country has complacently assumed that we lead all other Nations in our commitment to the goal of equal educational opportunity for all citizens. It is true that universal education in the U. S. has been achieved for virtually all children between the ages of six and thirteen. And it is also true that almost seventy percent of our youngsters who start school at age six actually graduate with high school diplomas.

Our leadership in the number of students attending college is indicated by the fact that only four percent of college age youth in the European Common Market Nations receive university degrees in contrast to twenty percent in this country. These seem to be heartening figures, especially when viewed in light of today's complex urban environment and the demand for more advanced job skills. To quote a recent TV ad, we must be doing something right.

It is not my purpose, however, to applaud our achievements and minimize our failures. There are too many sobering facts which point out the inadequacies of our system. One needs only to read the reports of innumerable investigating committees which describe the terrible condition of our inner

---

Aerospace Education Foundation, Sheraton-Park Hotel, Washington, D.C., 9-12-67

city schools. These reports accurately portray, I believe, a system grown sluggish with age. Sociologists and educators have observed time and time again that our public schools are non-rewarding, that students are "turned off" by a series of failure experiences, that students feel the learning environment is hostile and custodial rather than involving and challenging, and that many teachers fail to appreciate the individual differences in students. The recent Passow Report on the Washington, D.C. school system observed that if one applies the usual criteria of scholastic achievement -- holding power of the school, post-secondary employment status, and college entrance qualifying scores -- the District schools do not measure up well. These are not unique characteristics of the D.C. school system; many of these same failures can be found in most of the larger urban systems throughout the country.

In a recent international study evaluating the teaching of mathematics to secondary school students, the United States ranked among the least effective in mathematics achievement. The IEA study reported the performance of each country by the percentile ranking of its students on a standardized test. Students were compared against

international standards derived from the combined performance of students from all countries in a given age or grade group. Only four percent of American 13 year-olds scored among the upper ten percent of the total population.

A couple of years ago, it became clear to those of us in the Bureau of Research at the U. S.Office of Education that money being invested in curriculum development was not yielding an adequate return. Small scale, fragmented curriculum development efforts were producing limited results. While it is not my purpose to critically examine these earlier investments, it should be observed that such efforts were not planned from the perspective of determining goals, marshalling the resources, and following through in an organized way to implement massive curriculum changes. We know from research a great deal about how to improve our current practices. What is sorely needed is a plan for implementation in the classroom.

The problems and shortcomings associated with our present day educational program indicate a need for a clearer definition of goals and an overhaul of the educational process. Fortunately, a method of arraying ends and means so that we have a clearer idea of the choices that are open to us has

been pioneered by the defense and aerospace industry. Flanagan[1] has pointed out, however, that systems analysis is not a magical formula for successful implementation of change. "In its application to education, objectives must be defined, input and output of the system have to be accurately measured, and all relevant conditions described and defined. The specific factors which have prevented effective use of these approaches in education are a lack of well-defined objectives and inadequate measuring procedures to determine whether the student has achieved the objectives set for him". We are all well aware of the benefits of applying this systematic approach to such complex problems as weapons systems development or aerospace research. Secretary McNamara's success in modifying the organization of the Defense Department in such a way that all planning and procurement could be focused on missions or objectives that cut across the boundaries of the three services and extend beyond the confines of the annual budget illustrates the point. Systems analysis has become such a significant tool in the management of complex business enterprises that no large company now ignores it.

---

[1] Flanagan, John, "Functional Education for the Seventies," Phi Delta Kappan, Sept. '67 p. 28.

My purpose today will be to argue that this same methodology can be applied to the problems of education, even though we are dealing with a complex social system. It is this system, labeled the Organic Curriculum, which I will describe in detail now. First, I would like to spend a few minutes talking about the goals or objectives of an educational system for the 70's. Then let's consider the characteristics of the system which will make the achievement of these goals possible. Finally, I would like to summarize briefly some of the steps which we are taking to achieve this overall plan.

It is our conviction that any desired educational program should permit the development of basic learning skills together with appropriate entry-level job skills which qualify students for work. It is not enough, however, for such youngsters to have only narrowly defined job skills; they should be cross-trained in a cluster of occupations. They should also be prepared for their role as citizens and adults. Personal development in such skills as communication, inquiry, and problem solving should make it possible for a student to cope more effectively with man-made environments. While grappling with the outer world, he must derive an inner feeling of satisfaction and control over his own destiny.

In other words, achievement motivation and integrity of self should be enhanced through these learning experiences as well.

The student who graduates from high school should possess the necessary qualifications for maximum flexibility in his post-high school options. He might want to enter a university or college and pursue an academic program. He might enter a community college or technical school and receive post-high school occupational training. He should have the additional option of continuing his education in an adult education program if he chooses. Or he might even decide to go to work. The key point is that none of these options should be closed before high school graduation.

The emergence of a high school program which will ensure the attainment of these specifications or goals will certainly include academic as well as occupational training, but must also incorporate such elements as personal development, work study experience, and career counseling. Even the avocational or school sponsored recreational or social programs should be considered as an integral component of the system. Each of these elements and sub-parts must be defined in terms of their contribution to the attainment of specific behavioral objectives (Figure 1).

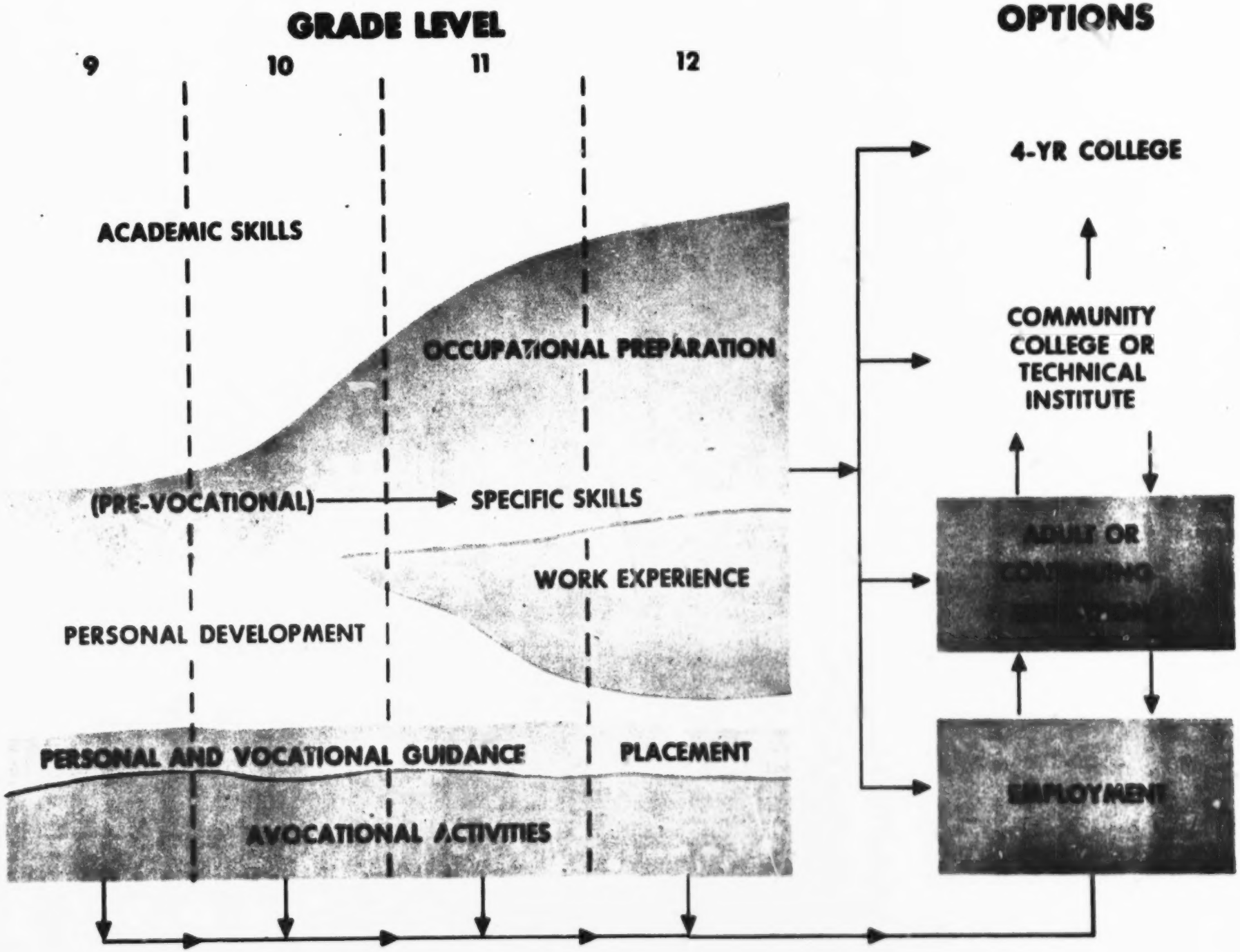
GRADE LEVEL
9
10
11
12
OPTIONS
ACADEMIC SKILLS
OCCUPATIONAL PREPARATION
(PRE-VOCATIONAL)
SPECIFIC SKILLS
WORK EXPERIENCE
PERSONAL DEVELOPMENT
PERSONAL AND VOCATIONAL GUIDANCE
PLACEMENT
AVOCATIONAL ACTIVITIES
4-YR COLLEGE
COMMUNITY COLLEGE OR TECHNICAL INSTITUTE
ADULT OR
EMPLOYMENT

Figure 1

The integration and interaction of these components will be a result of careful systems design and will emphasize the following characteristics: They will be combined in appropriate ways to insure the most efficient and effective learning for the individual student. Unique learning characteristics and styles will be catered to through the design of individually prescribed programs leading to the attainment of intervening and specific behavioral goals. Appropriate self-paced and self-instructional devices will be employed to accommodate the individual learning differences among students. Each student as far as possible will be given a feeling of success as he proceeds along the way, yet the content of the subject matter to be learned will be presented in a rigorous and demanding fashion. A truly integral curriculum must be developed so that each activity relates logically to the next activity and leads to the efficient achievement of adult behavioral goals. An "organic curriculum", as envisioned, would necessarily have to be interesting, challenging, and motivating to each student. Furthermore, after thorough experimentation and revision, the curriculum should be capable of replication in a number of different school districts and it should not be much more expensive than today's per-pupil cost.

There are many unanswered questions that are being, and must be, researched before such a curriculum can become operational. The problem of logistics alone is large and complex. How do you control the flow of students through the program without inhibiting individualized learning? Without the traditional Carnegie Units and subjects, how can school accreditation be achieved? As the role of teachers change, will they be acceptable? Would this system work better over a forty-eight week time cycle or should it be confined to the traditional thirty-six weeks? What are the problems involved in cataloging and comparing the behavioral objectives of various disciplines, with some hope of merging the academic and the occupational? These and many other fundamental questions must be answered before we are able to reach the "Kitty Hawk" phase of what might become a moon shot for education.

To undertake this systematic approach to curriculum design, two levels of strategy have been established (Figure 2). The first describes the pattern for communicating the program not only to the professional groups in education (which are legion) but also to parents and lay leadership at the local school district level.

PLAN FOR IMPLEMENTATION

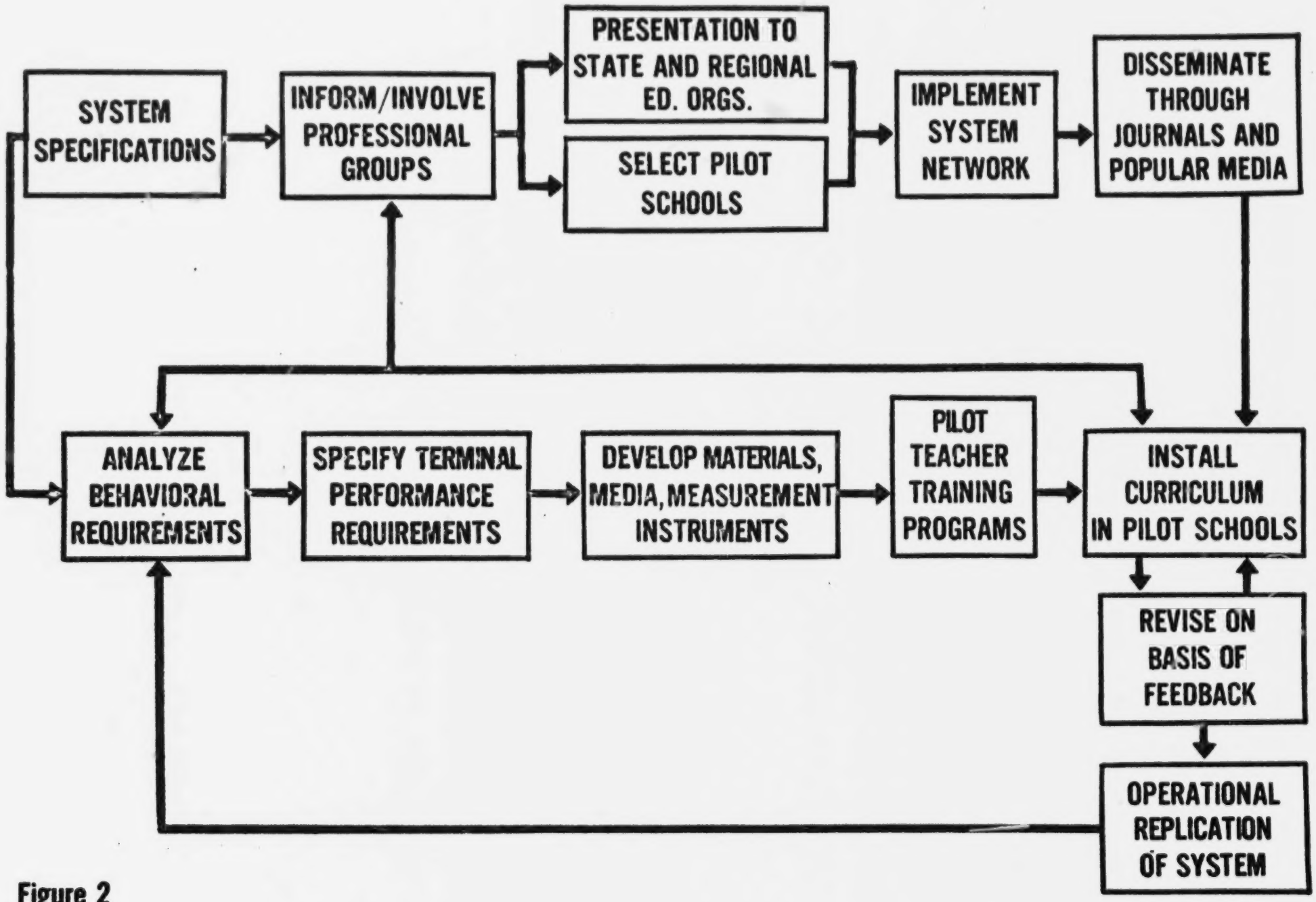
SYSTEM SPECIFICATIONS
INFORM/INVOLVE PROFESSIONAL GROUPS
PRESENTATION TO STATE AND REGIONAL ED. ORGS.
SELECT PILOT SCHOOLS
IMPLEMENT SYSTEM NETWORK
DISSEMINATE THROUGH JOURNALS AND POPULAR MEDIA
ANALYZE BEHAVIORAL REQUIREMENTS
SPECIFY TERMINAL PERFORMANCE REQUIREMENTS
DEVELOP MATERIALS, MEDIA, MEASUREMENT INSTRUMENTS
PILOT TEACHER TRAINING PROGRAMS
INSTALL CURRICULUM IN PILOT SCHOOLS
REVISE ON BASIS OF FEEDBACK
OPERATIONAL REPLICATION OF SYSTEM

Figure 2

The second level of strategy is to state the program out-put specifications in terms of behavioral objectives. Without these specifications, there will be no basis for deciding what learning interventions or teaching strategies would be most effective. Initially, the behavioral objectives would be classified in terms of the traditional discipline orientations. Thus, science, math, English, social studies, and vocational education will be approached through involving those who represent the established interest. We predict that a careful analysis and evaluation of the behavioral objectives by discipline will lead to the identification of wasteful redundancies in teaching the same or similar objectives.

More important than redundancies are the gaps. There may be important educational objectives which should be taught somewhere in the curriculum but in fact are not taught anywhere. In the interest of efficient learning it may be more sensible to re classify some of the objectives into new groupings that are independent of the disciplines from which they were originally derived. For example, the principles of scientific method may be better taught in industrial arts or Food Service than in Physics.

Let me digress for a moment. Two problems immediately confront us as we attempt this massive effort at specifying

behavioral objectives. First, not all of the goals that students should achieve can be defined in terms of specific observable behaviors. Second, no single catalog of objectives will be acceptable to all schools. We hope, however, that there is a greater degree of commonality in the objectives across districts and regions than is presently supposed. To insure that these objectives will be acceptable to the schools with which we work, it is essential that subject matter experts work intimately with the classroom teacher and the local curriculum planners. Writing behavioral objectives is a demanding task and it is essential that experienced behavioral technologists be centrally involved. It is also important that appropriate representatives from the professional organizations such as the National Science Teachers Association or the American Association for the Advancement of Science be included. Thus, the Office of Education will be involved in bringing together teams of scholars made up of behavioral scientists, subject matter specialists, classroom teachers, and professional society representatives.

The organizations that either have or could develop such teams are sufficiently short in number that soliciting bids is not feasible for all of the discipline areas. For this reason, the Bureau will attempt to identify the one or

more promising sources and invite them to submit unsolicited proposals for development and classification of objectives by discipline. A tentative decision has been made to encourage proposals in the very near future for behavioral objective definition efforts in the following disciplines: mathematics, science, communications, humanities, social studies, vocational education and personal and social skills development. We hope that proposals will be received and reviewed and that contracts will be let before January, 1968.

Following the specification of the terminal performance requirements, the synthesis of behavioral objectives among the various disciplines will be undertaken. A standard vocabulary or glossary of action words will be developed as a basis for coding and classifying the various objectives identified. Each objective will then be classified in terms of the process of learning described. Sets of objectives will be spelled out with specifications for both the interim or intervening objectives as well as descriptions of how one set of objectives can be related to another. As appropriate models for evaluating, analyzing, and synthesizing behavioral objectives are developed, contracts will be awarded in additional disciplines. Because some sets of objectives are likely to be finished before others it should be possible to

develop the learning materials and the interventions well before the total effort at establishing behavioral objectives is completed.

Moving now to the next step in our plan for implementation, we will concentrate our efforts on the development of appropriate materials, the selection of media, and the development of measurement instruments. The testing of a sub-system of this model is about to get underway at the Naval Academy at Annapolis. There, contracts will be let in each of three subject matter areas, economics, psychology, and physics. Once the sub-system in these subjects has been tested and validated it can then be used to develop other sub-systems or learning interventions at the high school level. You will note that we call for the intensive training of teachers following the development of appropriate materials and media. This then leads to the installation of the new curriculum in the pilot schools.

To date a number of these prescribed actions have taken place. Seventeen school districts (Figure 3) have been selected representing old, new, small, large and geographically distributed school districts around the country. Each district was asked to assign a person to a two week training program for the purpose of providing orientation and a thorough grounding in the principles associated with the organic

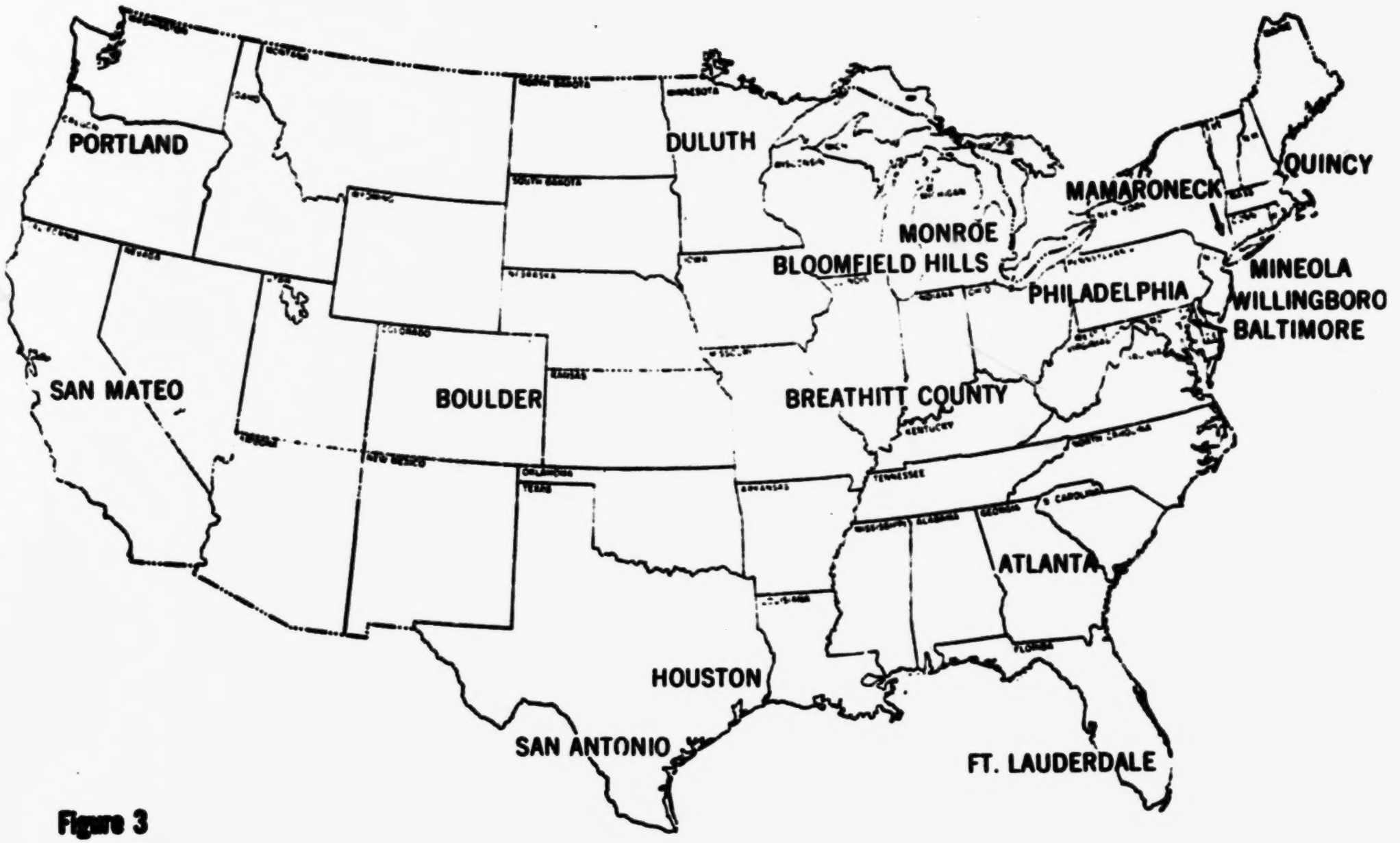
PORTLAND
DULUTH
QUINCY
MAMARONECK
MONROE
BLOOMFIELD HILLS
MINEOLA
WILLINGBORO
PHILADELPHIA
BALTIMORE
SAN MATEO
BOULDER
BREATHITT COUNTY
ATLANTA
HOUSTON
SAN ANTONIO
FT. LAUDERDALE

Figure 3

curriculum. Incidentally, we have agreed with each of the seventeen network school districts that we will pay the salary of the change agent assigned full time to the task of providing liaison not only with the Office of Education but with the other school districts making up the network. Each change agent was selected by the school superintendent as his designated representative for implementing the necessary changes over the five year time period allotted to this endeavor. Periodic meetings will be held on a national level attended by Office of Education representatives, superintendents, change agents, members of the Board of Education for host communities, State Department representatives, local university representatives, etc. Meetings have already been held in Fort Lauderdale, Florida and Duluth, Minnesota. These meetings provided an opportunity for both formal and informal exchanges of information while developing local school district identity with the larger program. During the first year of effort while the behavioral objectives are being developed, we are looking to each school to prepare the way for the subsequent introduction of the new curriculum.

In all, our strategy calls for a five year plan which will require an investment of $30,000,000 over the next five years. The network schools will be looking for funds

from other sources such as private industry, foundations and other government agencies to carry the major burden of cost (Figure 4). Incidentally, at the present time we are funding jointly a number of projects impacting on ES'70 with several other government agencies including the Department of Labor, Department of Defense, Office of Economic Opportunity, public Health Service and The National Science Foundation. Manpower resources are as important as dollars. It is only through the involvement of various interest groups and resource personnel that an effective integration between the various traditional subject areas of education can be established.

I have now covered in capsulated form the various steps to be undertaken in the unfolding of this major curriculum effort. In conclusion, let me review briefly with you this systems approach to meeting the requirements of public education in this country.

What are the characteristics of systems planning envisioned by ES'70? First, the characteristics must be defined in terms of their relationship to behavioral attainment

OFFICE OF EDUCATION

LOCAL SCHOOLS

CITIZENS GROUPS

PRIVATE ENTERPRISE

PROFESSIONAL ASSOCIATIONS

UNIVERSITY AND COLLEGE STAFF

OTHER AGENCIES AND FOUNDATIONS

Figure 4

by individual pupils (Figure 5). Some of the background characteristics of inputs which must be worked with include motivation, aptitudes, and career objectives.

The system must be learner-centered rather than teacher-centered. By careful pre-planning and comparison of the likelihood of pupil success the most suitable material and technological resources can be utilized within the context of an individualized curriculum.

Individualized study can be implemented through the expanded utilization of flexible scheduling. All study patterns should be directed toward the attainment of interim behavioral objectives as individual students progress through modular units of instruction toward adult behavioral goals.

By improving the progress assessment tools available to the profession, interim and final results can be more candidly and effectively measured.

A systematic emphasis on participation, persuasion and information sharing can go a long way toward coordinating the separate elements of the system while dispelling the fear of federal authority.

PUPIL CHARACTERISTICS	SYSTEM CHARACTERISTICS	GOALS
MOTIVATION	LEARNER CENTERED	LEARNING SKILLS
APTITUDES	MEANINGFUL	OCCUPATIONAL SKILLS
CAREER OBJECTIVES	MULTI-MEDIA	CITIZENSHIP
	WORK STUDY	PERSONAL DEVELOPMENT
	FLEXIBLE SCHEDULING	SELF FULFILLMENT
	BEHAVIORAL OBJECTIVES	
	FEED BACK & REVISION	

Figure 5

Mobilization of specialists in the areas of mathematics, science, communications, humanities, social studies, vocational education and personal and social skills into a flexible network of program development and information sharing will enhance the assignment of specific responsibilities for curriculum development.

Finally, the characteristics of predicting the combined effect of several lines of simultaneous action on one another is essential. In this way, unwanted consequences can be reduced and alternative lines of compensating action generated.

To sum up, what I have been describing is a new kind of educational program which incorporates the idea of a continuous progress curriculum with instructional techniques that emphasize the active development, the positive achievement and self-direction of students.

The excellence and variety of the educational program depends to a large extent upon our creativity and financial resources. But I think our nation possesses these assets in abundance.

mp/10-18-67